PROMISE® TECHNOLOGY, INC.

VTRAK
J610s, J310s
PRODUCT MANUAL

Version 1.1

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In this *Product Manual*, the appearance of products made by other companies, including, but not limited to software, servers and disk drives, is for the purpose of illustration and explanation only. Promise Technology does not recommend, endorse, prefer, or support any product made by another manufacturer.

Contents

Chapter 3: Management, cont.

CLI Command Set, cont.

Chapter 1: Introduction

Thank you for purchasing Promise Technology's VTrak J610s or J310s external disk array subsystem.

About This Manual

This *Product Manual* describes how to setup, use and maintain the VTrak J610s or J310s external disk subsystem. It also describes how to use the built-in command-line interface (CLI) software.

This manual includes a full table of contents, index, chapter task lists and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important

An *Important* calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

Overview

The Promise VTrak J610s and J310s are optimized for organizations deploying cost-effective small-to-medium application clusters, disk-to-disk backup and midrange storage solutions.

Figure 1. VTrak J610s front view
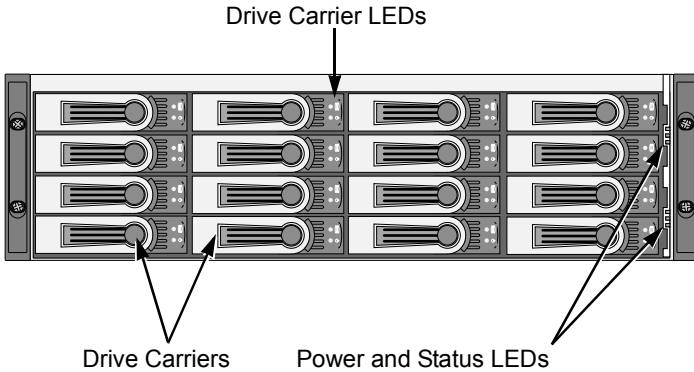
Figure 2. VTrak J310s front view with bezel removed
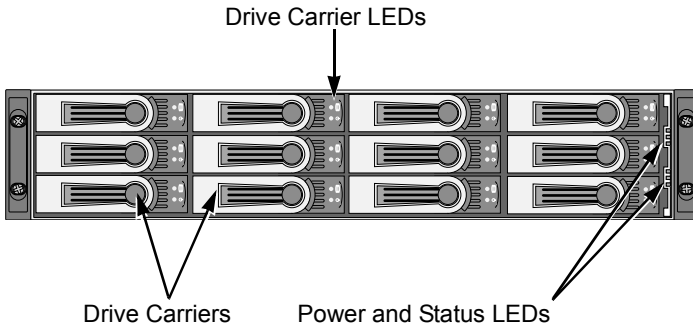
The dual 3Gb SAS host interface ports offer the ease of management and performance required by companies running popular departmental and back-office applications including file/print, e-mail, database and Web services

Figure 3. VTrak J610s rear view

I/O module 1   I/O module 2

Power Supply 1   Cooling Unit 1   Cooling Unit 2   Power Supply 2
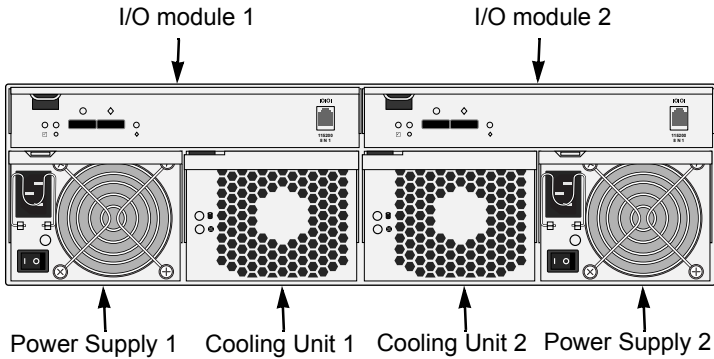
Figure 4. VTrak J310s rear view

Power Supply 1   Cooling Unit 1   Cooling Unit 2   Power Supply 2

I/O module 1   I/O module 2
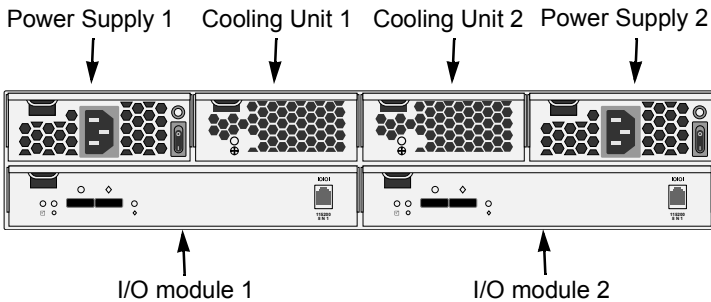
The two external SAS ports provide the needed connectivity and bandwidth for large capacity solutions requiring multiple JBOD boxes cascaded together while still providing dual server support and host port failover or aggregation.

Architectural Description

The VTrak J610s packs up to 16 drives per system, offering industry-leading capacity in just 3U of standard 19-inch rack space. The VTrak J310s supports up to 12 drives per system, in just 2U of standard 19-inch rack space. The J610s and J310s unit's compact form factor maximizes density, increasing capacity per unit of rack space.

Multiple J610s and J310s systems can also be connected to the same server using standard SAS features to deliver massive storage to capacity hungry applications such as disk-to-disk backup, media archiving, video surveillance and compliance storage

Promise has designed the J610s and J310s chassis to be fully compatible with all future Promise external storage products. By using the same chassis, drive carriers, and cooling units, upgrading the RAID controllers and JBOD modules is fast and simple.

With the VTrak J610s and J310s, Promise has dramatically narrowed the gap between simple fault tolerance and *No Single Point of Failure*. The VTrak J610s and J310s use a fully redundant, hot-swap design and continuously monitors all system components. It can withstand failures to disks, power supplies, cooling and I/O modules without interrupting system operation.

Features and Benefits

Feature	Benefit
3U or 2U 19-inch wide enclosure	Installs easily in any standard rackmount.
Supports Serial Attached SCSI disk drives	Allows you to use the new dual-port SAS disk drives.
Supports Serial ATA disk drives	Allows you to use your legacy SATA disk drives.
Hot-swap feature for drive carriers, I/O modules, power supplies and fans	Allows a defective component to be replaced without interrupting data accessibility to the host system.
Tool-less field-replaceable units (FRUs)	All FRUs can be replaced without tools, saving time and effort for support personnel.
Complete cable-less design	All components easily plug directly into boards. No cables to complicate setup or maintenance.
Redundant, hot-swappable cooling units	Load sharing and full operation even with multiple failed fans.
Redundant, hot-swappable power supplies	Load sharing and full operation even with a failed power supply.
Dual, active/active I/O Modules	High level of availability even with a failed I/O module.
One expansion SAS port I/O module	Enables cascading JBOD subsystems.
Command-line interface	Control and monitoring with simple, straightforward interface.
Management through in-band SAS or serial port	Choice of local or network management options
Compatible with leading SAS HBA and RAID cards	Easy, works-the-first-time connections with your current systems

Specifications

Drive Capacity: J610s, 16 drives. J310s, 12 drives.

External I/O Ports: SAS host port and SAS expansion port.

Supported Disk Interfaces: Serial Attached SCSI (SAS) and Serial ATA (SATA), 3Gb/s and 1.5Gb/s

Supported Operating Systems:

- Windows Vista, Business, Enterprise, or Ultimate
- Windows 2003 Server
- Windows XP Professional
- Windows 2000

- RedHat Linux
- SuSE Linux
- Novell Netware
- Sun Solaris

The list above refers to 32-bit and 64-bit versions of the OS in the Host PC or server. The actual OS support depends upon your SAS HBA or RAID adapter. Check your SAS HBA or RAID adapter user documentation.

Voltage: 100–240 VAC Auto-ranging.

Current: 8 A @ 100 VAC; 4 A @ 240 VAC Current rating with two power cords

Power Consumption (not including disk drives):
J610s, 108.38 W.
J310s, 100.87 W.

Power Consumption (including disk drives):
J610s, 523.91 W.
J310s, 412.51 W.

Power Supply:
J610s, Dual 500W, 100–240 VAC auto-ranging, 50–60 Hz, dual hot swap and redundant with PFC, N+1 design.
J310s, Dual 400W, 100–240 VAC auto-ranging, 50–60 Hz, dual hot swap and redundant with PFC, N+1 design.

Operating Temperature:
5° to 40°C operational
-40° to 60°C non-operational

Relative Humidity: Maximum 95%

Vibration: Random, 0.21 grms, 5 to 500 Hz, 30 Mins, X, Y, Z axis

Dimensions (H x W x D):

J610s, 13.1 x 44.7 x 56.1 cm (5.2 x 17.6 x 22.1 in)

J310s, 8.8 x 44.7 x 56.1 cm (3.5 x 17.6 x 22.1 in)

Net Weight:

J610s, 30.5 kg (67.2 lb) without drives, 38.5 kg (84.9 lb) with 16 drives, assuming 0.5 kg (1.1 lb) per drive.

J310s, 26.5 kg (58.4 lb) without drives, 32.5 kg (71.7 lb) with 12 drives, assuming 0.5 kg (1.1 lb) per drive.

Gross Weight (including carton):

J610s, 37.5 kg (82.7 lb) without drives.

J310s, 33.0 kg (72.8 lb) without drives.

Safety: CE, FCC Class A, VCCI, C-Tick, cUL, TUV, CB, BSMI, MIC.

Warranty and Support

Warranty: Three years complete system limited warranty.

Support: 24x7 email and phone support (English only). 24x7 access to Promise support site for drivers, firmware, and compatibility.

CE Statement

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

GOST-R Statement

Предупреждение. Данный продукт относится к классу A. В домашних условиях он может быть причиной возникновения радиопомех, в этом случае пользователю, возможно, потребуется принять соответствующие меры.

IRAM Statement

Advertencia: Este es un producto de clase A. En un ambiente doméstico, este producto puede causar interferencia de las ondas de radio, en cuyo caso se podría requerir que el usuario tome las medidas adecuadas.

MIC Statement

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Chapter 2: Installation

Unpacking the VTrak

The VTrak J610s or J310s box contains the following items:

- VTrak J610s or J310s Unit
- *Quick Start Guide*
- Front bezel and key (J310s only)
- RJ11-to-DB9 serial data cable
  (Units with one I/O module: 1)
  (Units with two I/O modules: 2)
- 1.0m (3.3 ft) SFF-8088 4X to 4X external SAS cable
  (Units with one I/O module: 1)
  (Units with two I/O modules: 2)

- Screws for disk drives
  (J610s: 70, including 6 spares)
  (J310s: 50, including 2 spares)
- Left and right mounting rails
- Left and right center-mount brackets
- 1.5m (4.9 ft) Power cords (2)
- CD with *Product Manual* and *Quick Start Guide*

	Warning
	The electronic components within the VTrak are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the VTrak or its subassemblies.

Figure 1. VTrak J610s rear view
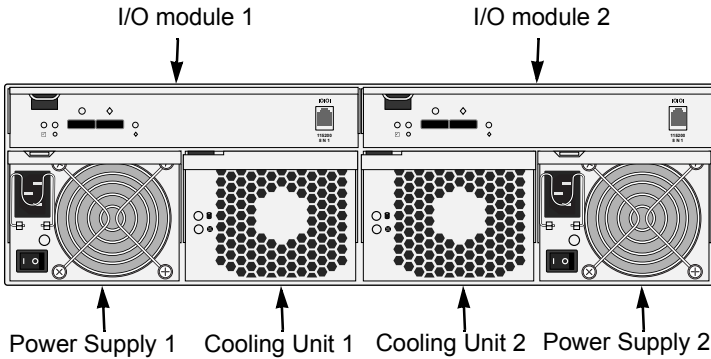
Figure 2. VTrak J310s rear view
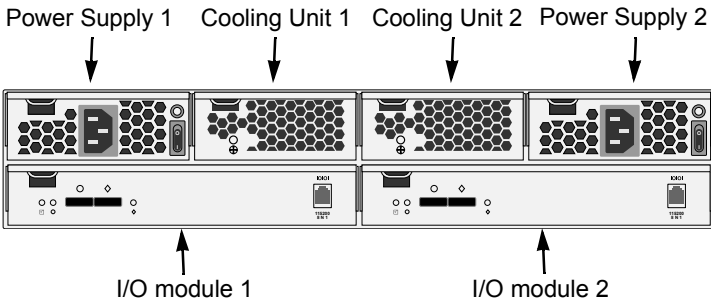
Some VTraks ship with a single I/O module and a blank unit installed in the place of the second I/O module. You can upgrade your VTrak by installing a second I/O module. See page 53.

Some VTraks ship with a single power supply and an auxiliary cooling unit installed in the place of the second power supply to provide a comparable level of air circulation inside the enclosure.

Mounting VTrak J610s in a Rack

The J610s subsystem installs to the rack using the supplied mounting rails. You can also use your existing rails.

Figure 3. VTrak J610s mounted in a rack with the supplied rails
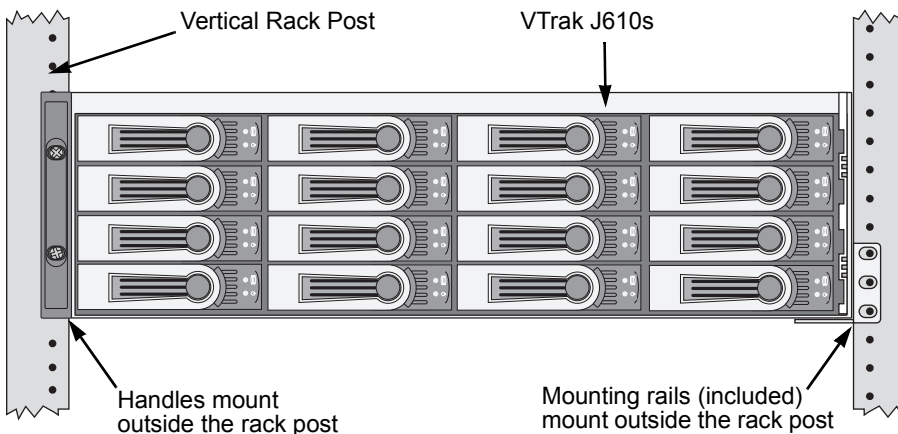
Vertical Rack Post

VTrak J610s

Handles mount outside the rack post

Mounting rails (included) mount outside the rack post

Cautions

- At least two persons are required to safely lift, place, and attach the VTrak subsystem into a rack system.
- Do not lift or move the VTrak subsystem by the handles, power supplies or the controller units. Hold the subsystem itself.
- Do not install the VTrak subsystem into a rack without rails to support the subsystem.
- Only a qualified electrician who is familiar with the installation procedure should mount and install the VTrak subsystem.
- Be sure all switches are OFF before installing the VTrak subsystem or exchanging components.

To install the J610s subsystem into a rack with the supplied mounting rails:

1. Check the fit of the mounting rails in your rack system. See Figure 4.
2. Adjust the length of the mounting rails as needed.
3. Attach the mounting rail assemblies to the outside of the rack posts, using the attaching screws from your rack system.

    Be sure the support is on the bottom facing inward.

4. Square the rail assemblies in the rack.
5. Tighten the adjustment screws and the attaching screws.
6. Place the VTrak subsystem onto the rails.
7. Secure the VTrak subsystem to the rack through each handle, using the attaching screws from your rack system.

Figure 4. Rack mount assembly diagram
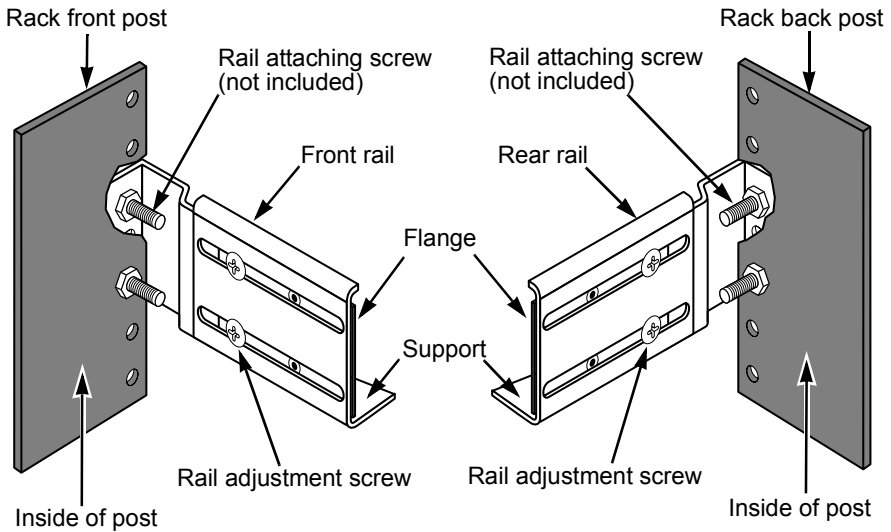
Mounting VTrak J310s in a Rack

The J310s subsystem installs to the rack using the supplied mounting rails. You can also use your existing rails.

Figure 5. VTrak J310s mounted in a rack with the supplied rails

Vertical Rack Post

VTrak J310s

Handles mount
outside the rack post

Mounting rails (included)
mount outside the rack post

Cautions

- At least two persons are required to safely lift, place, and attach the VTrak subsystem into a rack system.
- Do not lift or move the VTrak subsystem by the handles, power supplies or the controller units. Hold the subsystem itself.
- Do not install the VTrak subsystem into a rack without rails to support the subsystem.
- Only a qualified electrician who is familiar with the installation procedure should mount and install the VTrak subsystem.
- Be sure all switches are OFF before installing the VTrak subsystem or exchanging components.

To install the VTrak subsystem into a rack with the supplied mounting rails:

1. Check the fit of the mounting rails in your rack system. See Figure 7.
2. Slide the plates out of the mounting rails.
3. Attach one plate to each side of the VTrak subsystem.
   Line-up the six holes in the plate with the corresponding holes in the subsystem. Attach each plate with six screws (included). See Figure 6.
4. Slide one of the rails over the plate on one side of the enclosure.

The rail is designed to slide freely over the plate.

5. Attach a flange to each end of the rail, with the rail on the opposite side of the flange from the two-hole bracket.

6. Install the rail adjustment screws (included) through the flange into the rail. There are four screws for each flange. See Figure 7.

7. Place the subsystem with mounting rails into your rack system.

8. Attach the mounting rail assemblies to the outside of the rack posts, using the attaching screws from your rack system.

9. Square the rail assemblies in the rack.

10. Tighten the adjustment screws and the attaching screws.

11. Place the VTrak subsystem onto the rails.

12. Secure the VTrak subsystem to the rack through each handle, using the attaching screws from your rack system.
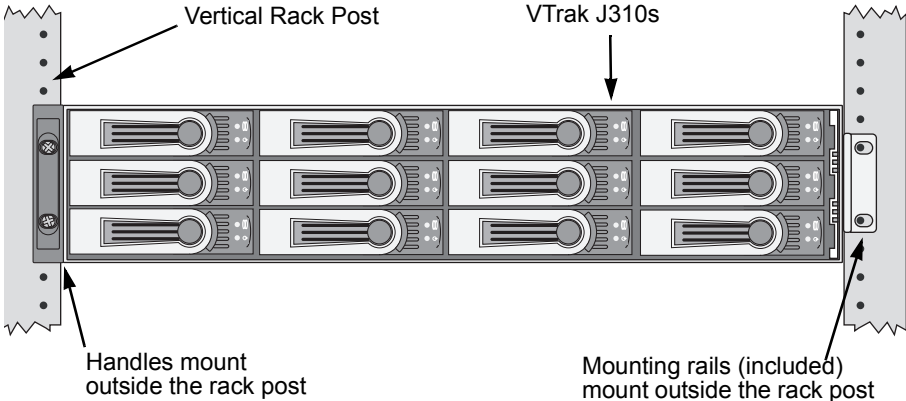
Figure 6. Sliding flange installation

Rear (connector end) of the subsystem

VTrak J310s

Sliding plate

Screws (6 each side)
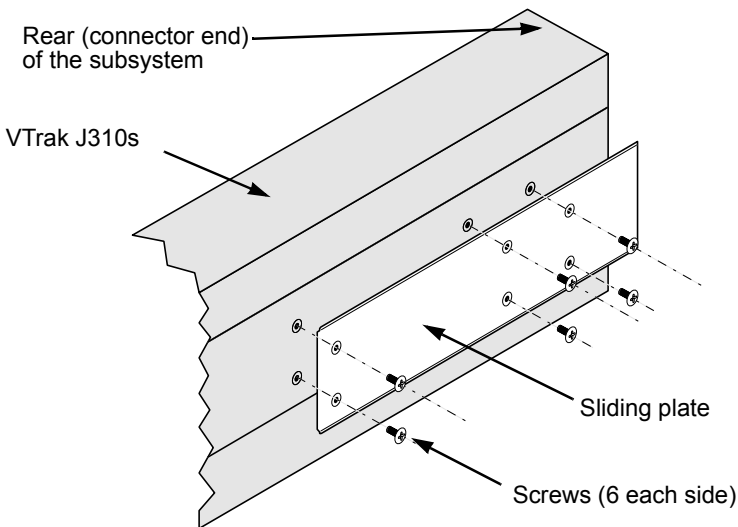
Figure 7. Mounting rail installation

Rack front post

Rack back

Rail adjustment screw

Mounting Rail

Sliding plate

Rail attaching screw
(not included)

Rail attaching screw
(not included)

Inside of post

Inside of post
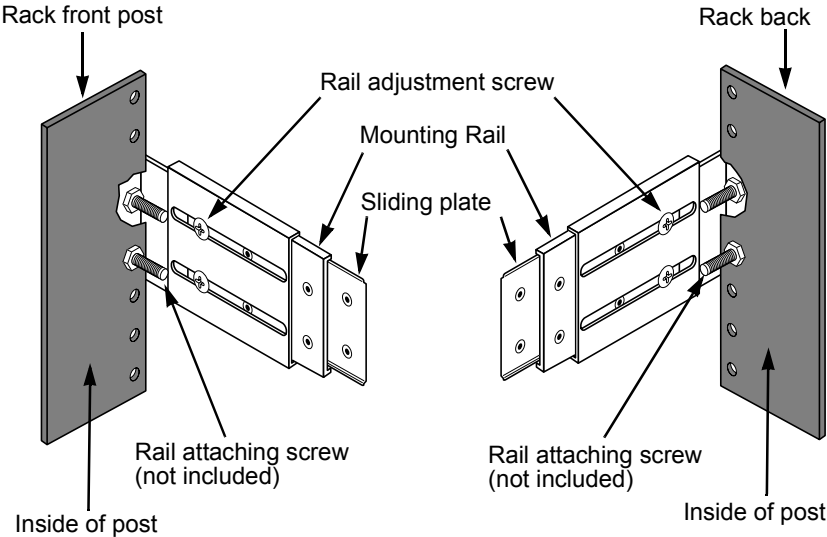
Installing Disk Drives

Populate the VTrak with 3.5-inch SAS or SATA disk drives.

Install all of the drive carriers into the VTrak enclosure to ensure proper airflow, even if you do not populate all the carriers with disk drives.

Caution

Use only the counter-sink screws supplied with the VTrak. Use of other types of screws can damage the enclosure or the adjacent drives.

Figure 8. Drive carrier mounting holes
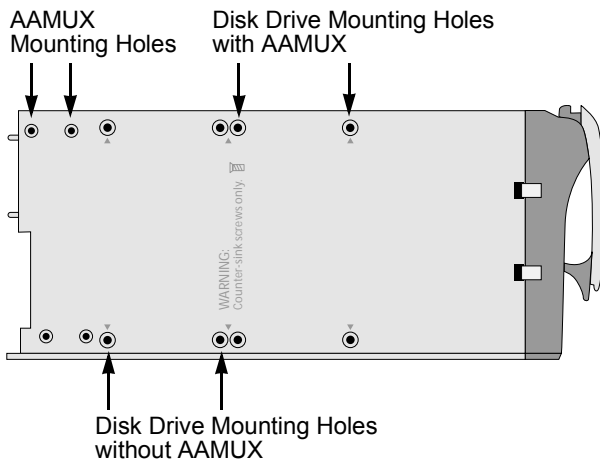
1. Remove the front bezel (J310s only).
2. Remove a disk drive carrier.
3. Optional. The AAMUX adapter is recommended for SATA disk drives used with VTraks with two I/O modules, so that both modules can access a SATA disk drive.

    Place the optional AAMUX into the disk drive carrier and attach it with the four screws.

    • Install only the screws supplied with the AAMUX.

    • The AAMUX fits into the carrier with the SAS connector at the back. See Figure 10.

    • Snug each screw. Be careful not to over tighten.

4. Carefully lay the drive into the drive carrier at the front, so that the screw holes on the bottom line up.

If you installed an AAMUX, lay the SATA disk drive in the carrier and slide it so the power and data connectors insert in to the AAMUX. See Figure 10.

5. Insert the screws through the holes in the drive carrier and into the bottom of the disk drive. See Figure 8.

    •   Install only the screws supplied with the VTrak.

    •   Install four screws per drive.

    •   Snug each screw. Be careful not to over tighten.

6. Reinstall the drive carrier into the VTrak chassis.

7. Repeat steps 2 through 5 until all of your disk drives are installed.

8. Replace the front bezel.

Figure 9. Drive carrier with SAS disk drive

SAS Disk Drive

Figure 10.Drive carrier with SATA disk drive and AAMUX

SATA Disk Drive

AAMUX adapter

SAS connector
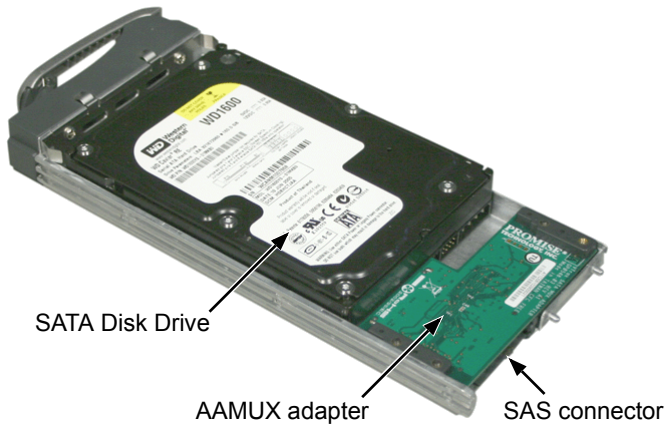
	Cautions
	• If you plan to operate your VTrak with fewer than a full load of disk drives, install all of the drive carriers into the enclosure, to ensure proper airflow for cooling.
	• A VTrak J610s or J310s carrier is similar in appearance but is NOT interchangeable with a VTrak M500f/i/p drive carrier.

	Important
	Be sure each drive is securely fastened to its carrier. Proper installation ensures adequate grounding and minimizes vibration. Do not install drives with fewer than four screws.

Drive Numbering

Each disk drive in the J610s or J310s unit is identified by a number that corresponds to the Port number used for management. See "Link Command" on page 40.

Numbers are stamped above each drive bay for easy identification.

Figure 11.VTrak J610s drive slot numbering
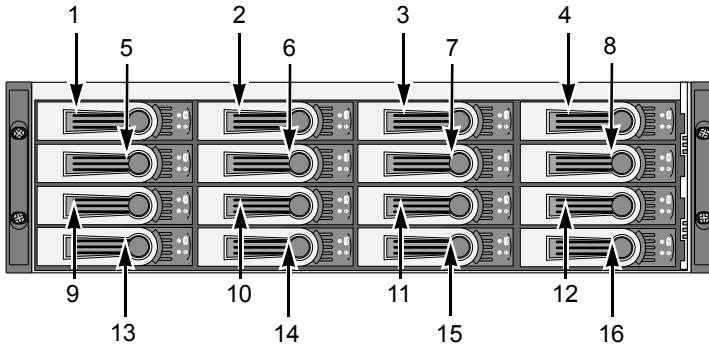
Figure 12.VTrak J310s drive slot numbering
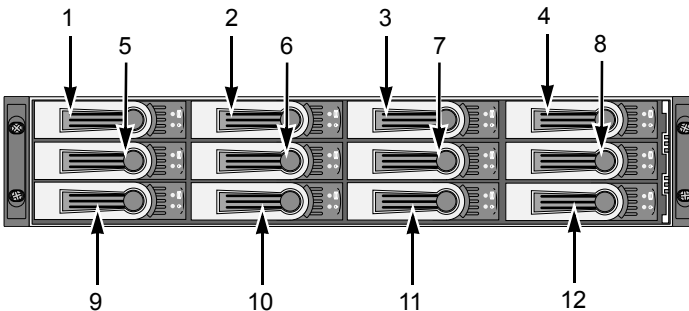
Setting Up Data Cable Connections

VTraks provide Direct Attached Storage (DAS) support to the Host PC.

Figure 13. VTrak J610s has one or two I/O modules

I/O module 1
(default primary)
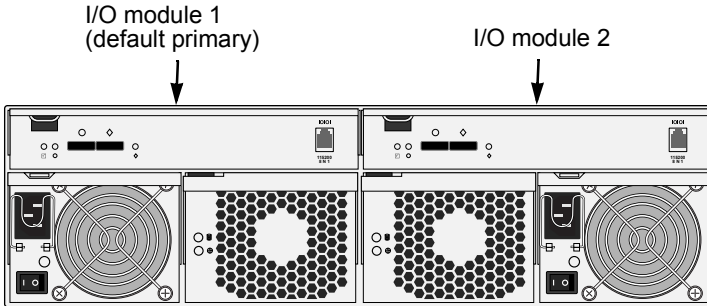
I/O module 2

Figure 14.VTrak J310s has one or two I/O modules

I/O module 1
(default primary)
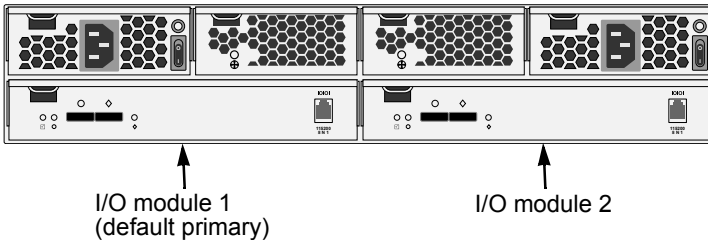
I/O module 2

There can be one or two Input Output Modules (I/O modules) on the VTrak.

- If your VTrak has two I/O modules, I/O module 1 (on the left) is the default primary.
- If your VTrak has only one I/O module, that I/O module is the default primary.

Under SAS specifications, both I/O modules are active at the same time. The terms *primary* and *secondary* are for enclosure management purposes only. To verify which I/O module is the default primary, see "Enclosure Command" on page 36.

Figure 15.I/O modules have a circle-icon port and a diamond-icon port

Diamond-icon port (CN2) LED

Circle-icon port (CN1) LED

I/O Module Status LED
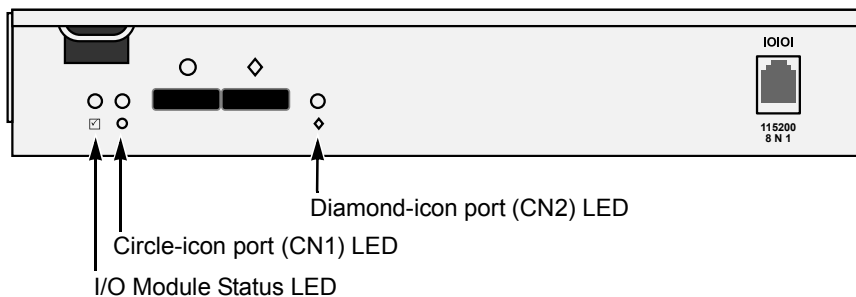
Each I/O module has one circle-icon port and one diamond-icon port.

In the CLI command set, the circle-icon port is called CN1 and the diamond-icon port is called CN2. See "CLI Command Set" on page 35.

Note

SAS HBA cards are User-supplied items. They are not included with the VTrak unit.

Basic DAS Connection

Figure 16. An example of a basic DAS connection between one Host PC and one VTrak J310s unit. The J610s is similar

Connect to either data port

VTrak J310s

SFF-8088 external
4X to 4X SAS cable

SAS HBA Card

PC
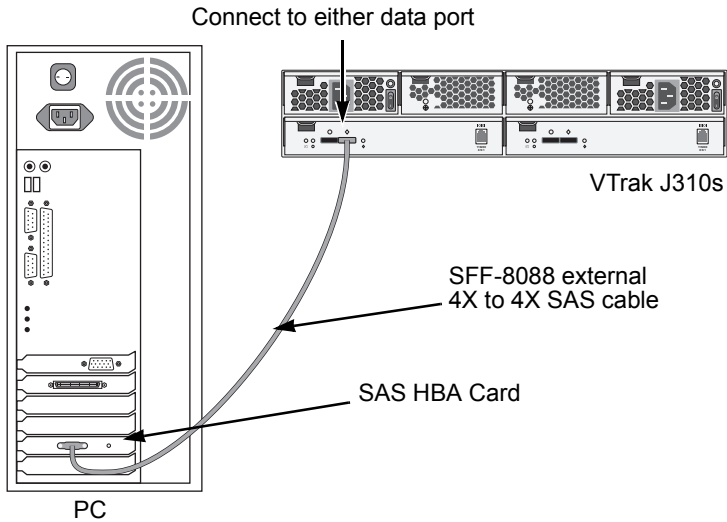
The arrangement above is the minimum DAS system with a single SAS HBA card in the Host PC. Connect the SAS HBA card to either port of the I/O module on the VTrak.

Use a SFF-8088 4X to 4X external SAS cable (supplied with the VTrak).

Because the Host SAS HBA card is an end device, you can connect it to either SAS data port on the VTrak.

Cascading DAS Connection

If you have multiple VTraks and want to manage them from the same SAS HBA card in the Host PC, connect the VTraks in a cascade. See Figure 17.

To setup a cascading DAS connection:

1. Connect the SAS HBA card in the Host PC to either of the SAS ports, circle- or diamond-icon) on the I/O module of the first VTrak.

    Use a SFF-8088 4X to 4X external SAS cable (supplied with the VTrak).

2. Connect the remaining port on the same I/O module of the first VTrak to the I/O module of the next VTrak.

    Be sure to connect circle icon to diamond icon or vice versa.

    Use a SFF-8088 to SFF-8088 SAS cable to connect the VTraks.

You can cascade up to four VTraks in this manner. You can mix J610s and J310s units in the same cascade.

Figure 17. Two examples of cascaded DAS connections between one Host PC and two VTrak J310s units. The J610s is similar

SAS HBA Card

SFF-8088 external
4X to 4X SAS cable

PC

SFF-8088 to SFF-8088
SAS cable

CN1

CN2

VTrak J310s

CN2

CN1

VTrak J310s

Cascade Configuration 1   Cascade Configuration 2
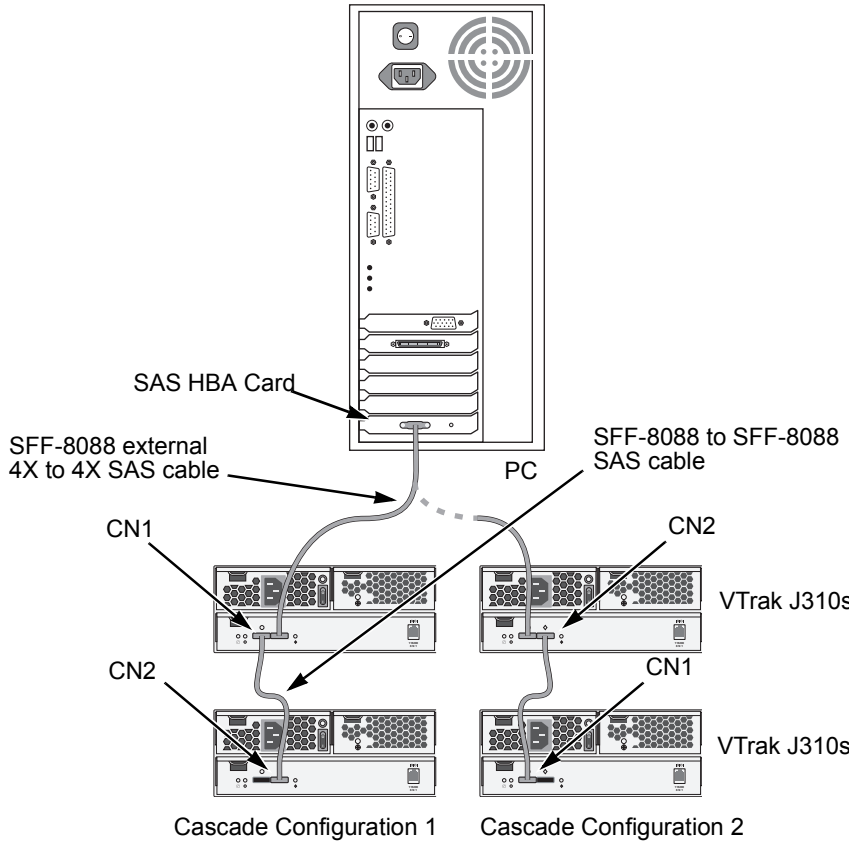
Redundant DAS Connection

A fully redundant arrangement requires:

- Two VTrak J610s or J310s units with dual I/O modules
- Two Host PCs with a SAS HBA card in each PC

Each HBA card connects to a different I/O module in the first VTrak, to provide a separate cascade. See Figure 18.

To setup a redundant DAS connection:

1. Connect the SAS HBA card in the first Host PC to either of the SAS ports, circle- or diamond-icon) on the first I/O module of the first VTrak.

    Use a SFF-8088 4X to 4X external SAS cable (supplied with the VTrak).

2. Connect the SAS HBA card in the second Host PC to either of the SAS ports, circle- or diamond-icon) on the second I/O module of the first VTrak.

    Use a SFF-8088 4X to 4X external SAS cable (supplied with another VTrak).

3. Connect the remaining port on the first I/O module of the first VTrak to the first I/O module of the next VTrak.

    Be sure to connect circle icon to diamond icon or vice versa.

4. Connect the remaining port on the second I/O module of the first VTrak to the second I/O module of the next VTrak.

    Be sure to connect circle icon to diamond icon or vice versa.

    Use SFF-8088 to SFF-8088 SAS cables to connect the VTraks.

5. Connect the remaining VTraks in the same manner.

You can cascade up to four VTraks in this manner. You can mix J610s and J310s units in the same cascade.

Figure 18. An example of a redundant DAS connection between two Host PCs and four cascaded VTrak J310s units. The J610s is similar

SAS HBA Cards

SFF-8088 external
4X to 4X SAS cables

PC

PC

CN2

CN1

VTrak J310s

SFF-8088 to
SFF-8088
SAS cable

CN2

VTrak J310s

CN1

CN2

CN1

VTrak J310s

CN2

CN1

VTrak J310s

Cascade Configuration 1   Cascade Configuration 2
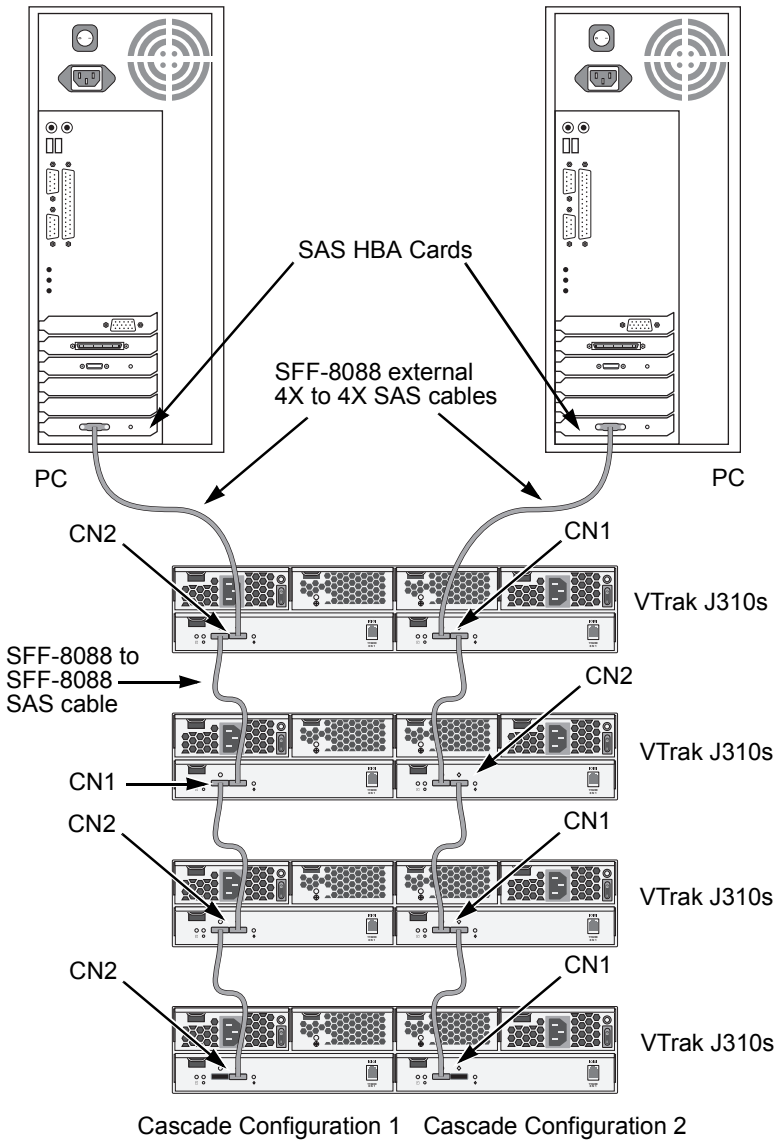
Setting Up Serial Cable Connections

Serial communication enables the Command Line Interface (CLI) on your PC to monitor to control the VTrak. The VTrak package includes one RJ11-to-DB9 serial data cable for each I/O module.

Figure 19. A serial connector is located on the I/O module. The J310s is shown. The J610s is similar
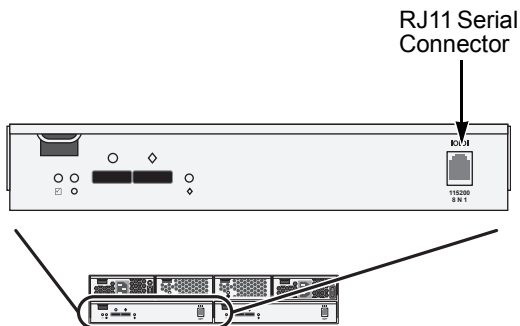
To set up a serial cable connection:

1. Attach the RJ11 end of the serial data cable to the RJ11 serial connector on one of the I/O modules.

2. Attach the DB9 end of the serial data cable to a serial port on the Host PC or Server.

If your PC has two DB9 COM ports, and your VTrak has two I/O modules, you can connect a second serial data cable to the I/O module on the right.

See "Setting Up Data Cable Connections" on page 20 for an explanation of which I/O module is the default primary. To verify which I/O module is the default primary, see "Enclosure Command" on page 36.

Connecting the Power

Plug the power cords and switch on both power supplies. When the power is switched on, the LEDs on the front of the VTrak will light up.

Figure 20.VTrak J310s front panel LED display. The J610s is similar
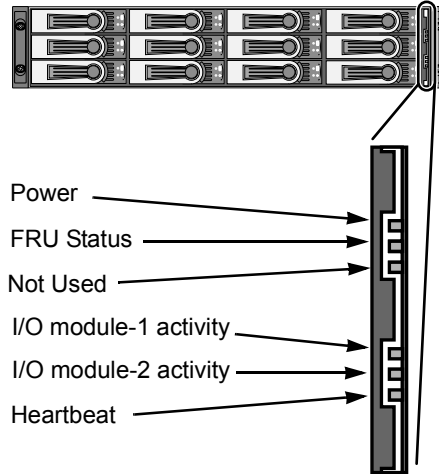
When boot-up is finished and the VTrak is functioning normally:

- The heartbeat LED blinks green once every 3 seconds if one I/O module is installed, or twice every 3 seconds if two I/O modules are installed.
- Power and FRU LEDs display green continuously.
- I/O module LEDs flash green if there is activity on that connection.

There are two LEDs on each Drive Carrier. They report the presence of power and a disk drive, and the current condition of the drive.

Figure 21.Drive carrier LEDs
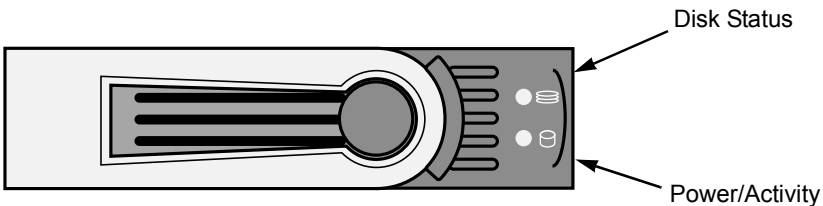
Within one minute, the Power/Activity should display Green.

If there is no disk drive in the carrier, the Disk Status LED and the Power/Activity LED will remain dark.

Setting Up the CLI Connection

The VTrak has a Command Line Interface (CLI) to manage all of its functions, including customization. Access the CLI via your PC's terminal VT100 or ANSI emulation program, such as Microsoft HyperTerminal.

With the VTrak running and the RJ11-to-DB9 serial data cable connected to the primary I/O module:

1. Change your terminal emulation program settings to agree with the following:

    •   Bits per second: 115200

    •   Data bits: 8

    •   Parity: None

    •   Stop bits: 1

    •   Flow control: none

2. Start your PC's terminal emulation program.

3. Press Enter once to launch the CLI.

    The **cli>** prompt on your screen indicates that you have a connection and the CLI is ready to accept commands.

    See "CLI Command Set" on page 35.

Chapter 3: Management

- Front Status Indicators (below)
- Drive Status Indicators (page 24)
- I/O Module Status Indicators (page 25)
- CLI Command Set (page 26)

Front Status Indicators

Even though the Command Line Interface (CLI) offers comprehensive monitoring of VTrak, the LED indicators on the VTrak J610s or J310s unit provide important status information.

When the power is switched on, the LEDs on the front of the VTrak will light up.

*Figure 1. VTrak J310s front panel LED display. The J610s is similar*
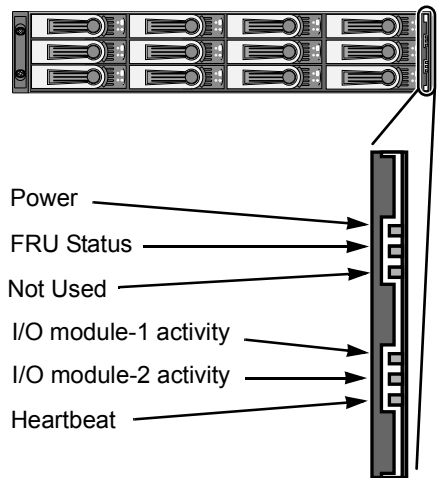
When boot-up is finished and the VTrak is functioning normally:

- The heartbeat LED blinks green once every 3 seconds if one I/O module is installed, or twice every 3 seconds if two I/O modules are installed.
- Power and FRU LEDs display green continuously.
- I/O module LEDs flash green if there is activity on that connection.

LEDs	State				
	Dark	Steady Green	Flashing Green	Amber	Red
Power	System Off	Normal			
FRU*	System Off	Normal		1 CU and/or 1 PSU failed	2 CU and/or 2 PSU failed
I/O Module 1 or 2	No Activity		Activity		
Heartbeat	System Off		Normal**		
* Field Replacement Unit: Cooling Unit (CU) or Power Supply Unit (PSU)					
** Blinks intermittently.					

Drive Status Indicators

After a few moments the Power/Activity should display Green.

If there is no disk drive in the carrier, the Disk Status LED and the Power/Activity LED will remain dark.

Figure 2. VTrak disk carrier LEDs

Disk Status
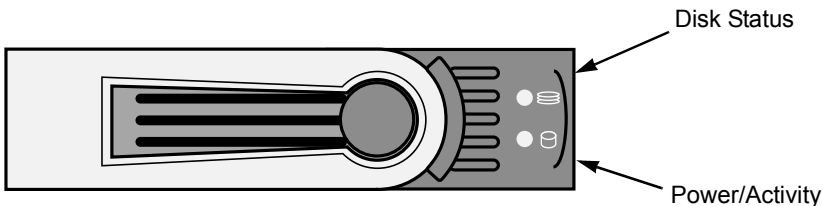
Power/Activity

The VTrak spins up the disk drives sequentially in order to equalize power draw during start-up. After a few moments the Power/Activity and Disk Status LEDs should display green.

If you have SATA disk drives installed without an AAMUX adapter (see page 16), the Power/Activity LED behavior depends on the specific disk drive.

The Disk Status LED behavior depends on your HBA or RAID controller. See the table below.

LEDs	State		
	Dark	**Steady Green**	**Flashing Green**
Power/Activity*	No Drive	Drive Present	Activity
Status	HBA/RAID controller determines the LED behavior**		
* Refers to SAS drives or SATA drives with an AAMUX adapter. For SATA drives without an AAMUX adapter, LED behavior depends on the specific disk drive.			
** Refer to the user documentation for your HBA or RAID controller for this information.			

I/O Module Status Indicators

The VTrak J610s or J310s I/O module has LEDs that indicate activity on each of its SAS ports.

Figure 3.   The I/O modules have two SAS ports

Diamond-icon port (CN2) LED

Circle-icon port (CN1) LED

I/O Module Status LED
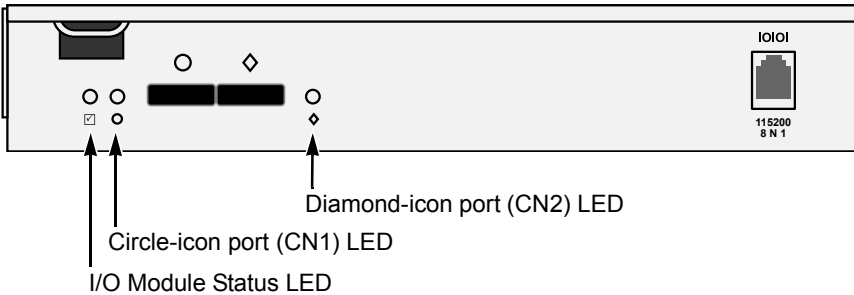
The I/O module status LED shows red at startup. Within 2 or 3 seconds, it turns green to indicate that the I/O module is ready.

LEDs	State			
	Dark	**Steady Green**	**Flashing Green**	**Red**
Connectors	Link Down	Link Up	Activity	
I/O Module Status	Off	Ready		Starting up*
* Turns green 2 to 3 seconds after subsystem startup.				

Figure 4. VTrak J610s power supply and fan LEDs

Power Supply LED   Fan LED
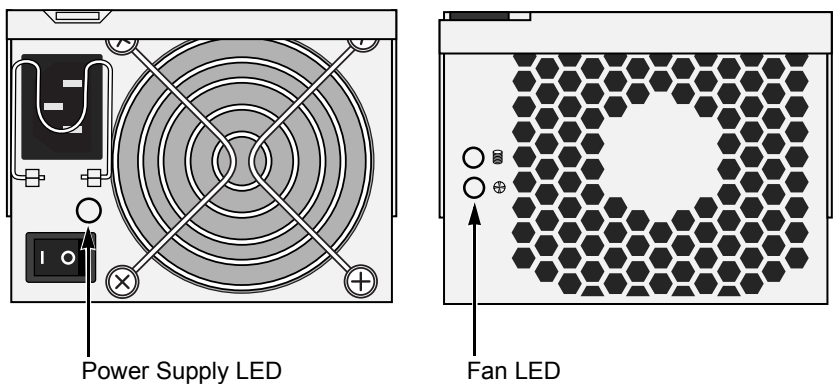
The battery LED on the cooling unit has no function on the VTrak J610s and J310s models.

Figure 5. VTrak J310s power supply and fan LEDs

Power Supply LED   Fan LED
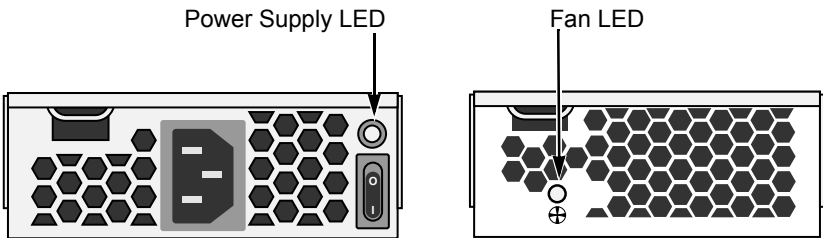
Under normal conditions, the power supply and fan LEDs should display green.

LEDs	State		
	Dark	**Green**	**Red**
Power supply	Not detected	OK	Failed
Fan	Not detected	OK	Failed

To check a component's installation, follow the same procedure as replacing the component, except that you reinstall the original component rather than a new one. In most cases, this action fixes a bad connection and allows VTrak to detect the component. If this action does not correct the problem, replace the unit.

CLI Command Set

The CLI uses the following set of commands:

cable – Specifies the length of cable for optimal signal quality.

enclosure – Displays full information on the VTrak enclosure and all its components, expander addresses, and SAS addresses.

help – Use alone to see the list of commands. Use with a command to see a list of options. Examples: **enclosure -help** or **enclosure -h**.

link – Displays the current status of the PHYs (links) and the error counter.

route – Displays addresses of components through a downstream (expansion) connection.

uptime – Displays the number of days, hours, minutes and seconds since the firmware was loaded (since the VTrak was started or restarted).

vpdr – Displays vital product data on field replaceable units.

? – Use alone to see the list of commands. Use with a command to see a list of options. Example: **enclosure -?**

	Note
	Command options are case-sensitive. Disable the Caps Lock on your keyboard.

Cable Command

The Cable command displays the current cable length settings for the two Host ports and the Expansion port. The I/O module supports cables from 1 to 8 meters in length.

To view current settings:

> cli>cable

The system returns:

> CN#1 Cable Length = 1 meter
> CN#2 Cable Length = 1 meter

CN#1 and CN#2 are the external SAS connectors on the I/O module. CN#1 is labeled with a circle icon. CN#2 is labeled with a diamond icon. See Figure 3.

To set Expansion connector CN2 for a 3-meter cable:

> cli> cable -a mod -s "cn2=3"

To verify the setting change:

> cli>cable

The system returns:

CN#1 Cable Length = 1 meter
CN#2 Cable Length = 3 meter

Note the cable length change for CN2.

Enclosure Command

The Enclosure command:

- Displays information about the J610s or J310s enclosure (below)
- Enables you to make enclosure settings (page 38)

Information List

The Enclosure command displays information about the J610s or J310s enclosure, including:

- Time since power-up
- Enclosure type
- I/O module information
- PSU (power supply) status and fan speeds
- Blower status and fan speeds

- Temperature sensor readings
- Temperature threshold settings
- Voltage sensor readings
- Expander SAS addresses
- Attached SAS addresses

The CLI reports information for the I/O module to which it is connected and for the rest of the components in the J310s enclosure.

Under SAS specifications, both I/O modules are active at the same time. For management purposes, the default primary I/O module role is **Primary**. If a second I/O module is present, its role is **Secondary**. See the arrow below for I/O Module Role in the display. Also see "Setting Up Data Cable Connections" on page 20.

In a J610s or J310s unit with two I/O modules, if the primary I/O module fails or is removed, the remaining I/O module becomes the default primary I/O module and assumes the **Primary** role. If the other I/O module is repaired or replaced, it becomes the secondary I/O module and assumes the **Secondary** role.

Viewing Information

To view enclosure information:

cli>enclosure

The system returns:

```
----------------------------------------------------------------------------------
Time Since Power Up: 1 day 9 hours 46 minutes 36 seconds
Enclosure: SAS JBOD [2U-12Bay or 3U-16 Bay]
I/O Module ID: 1                Max Num Of I/O Modules: 2
FwVersion: 1.07.0000.00         I/O Module Role: Primary  ◄──────────
MaxNumOfHDSlots: [12 or 16]     MaxNumOfPSUs: 2
MaxNumOfFans: 4                 MaxNumOfBlowers: 2
MaxNumOfTempSensors: 8          MaxNumOfVoltageSensors: 5

===========================================
PSU     Status       Fan1Speed       Fan2Speed
===========================================
1       Operational  14735 rpm       15037 rpm
2       Operational  15340 rpm       14361 rpm

===========================================
Blower  Status       Speed
===========================================
1       Operational  4017 rpm
2       Operational  4066 rpm

===========================================
ID  Location     Temp Reading    ID  Location     Temp Reading
===========================================
1.  Backplane    27C/80F         2.  Backplane    28C/82F
3.  Backplane    26C/78F         4.  Backplane    26C/78F
5.  I/O Module1  35C/95F         6.  I/O Module1  26C/78F
7.  I/O Module2  33C/91F         8.  I/O Module2  38C/100F

Thermal Management: Enabled
Allows to shut down the system when critical temperature is reached: Yes
Current minimum fan speed setting: medium low
Enclosure Temp Threshold: 61C/141F (critical) 51C/123F (warning)
Controller Temp Threshold: 71C/159F (critical) 61C/141F (warning)

===========================================
VoltageSensor   Voltage
===========================================
1               3.3V
2               5.0V
3               5.0V
4               12.0V
5               1.1V
```

Expander SAS Address:
SAS Base Addr:50 00 15 5D 21 AB 02 00
SSP SAS Addr: 50 00 15 5D 21 AB 02 3E
SMP SAS Addr: 50 00 15 5D 21 AB 02 3F

Attached SAS Address:
D01 SAS Addr: 50 00 15 E0 11 4E 5E B2
D02 SAS Addr: 50 00 15 E0 11 4E 80 C2
D03 SAS Addr: 50 00 15 E0 11 4C 22 02
D04 SAS Addr: 50 00 15 E0 11 4D E2 22
D05 SAS Addr: 50 00 15 E0 11 4D 8F B2
D06 SAS Addr: 50 00 15 E0 11 4D D0 62
D07 SAS Addr: 50 00 15 E0 11 4D DE E2
D08 SAS Addr: 50 00 15 E0 11 4D 8E F2
D09 SAS Addr: 50 00 15 E0 11 4C 97 62
D10 SAS Addr: 50 00 15 E0 11 4C 36 62
D11 SAS Addr: 50 00 00 E0 11 4F 18 E2
D12 SAS Addr: 50 00 00 E0 11 4F 18 D2
D13 SAS Addr: 50 00 00 E0 11 4D 8E 52
D14 SAS Addr: 50 00 00 E0 11 4D E2 22
D15 SAS Addr: 50 00 00 E0 11 4E 49 C2
D16 SAS Addr: 50 00 00 E0 11 4D DC F2
CN1 SAS Addr: No Device Attached
CN2 SAS Addr: 50 00 15 5F FF C0 22 3F

SAS addresses with a "D" represent physical drives. J310s units display only D01 through D12. J610s units display D01 through D16.

Settings List

The Enclosure command enables you to make settings for the enclosure. The J610s is shown. The J310s is similar.

- **Enclosure Warning Temperature** – 51° to 61°C (123° to 141°F), measured at the backplane. Fan speed increases until temperature falls below the threshold.

- **Enclosure Critical Temperature** – Exceeds 61°C (141°F). System shutdown after 30 seconds.

- **Controller Warning Temperature** – 61° to 71°C (141° to 160°F), measured inside the I/O module. Fan speed increases until temperature falls below the threshold.

- **Controller Critical Temperature** – Exceeds 71°C (160°F). System shutdown after 30 seconds.

- **Thermal Management** – Monitors enclosure temperature, adjusts fan speeds, displays red LED on cooling unit when a fan fails

- **Automatic Shutdown** – Shuts down the VTrak 30 seconds after the enclosure or controller reaches critical temperature.
- **Minimum Fan Speed** – Specifies the minimum fan speed when the VTrak reaches enclosure or controller warning temperature.

Making Settings

To set the enclosure critical temperature to 61°C (141°F):

cli>enclosure -a mod -s "enc_critical=61"

To enable Thermal Management:

cli>enclosure -a mod -s "thermalmanager=1"

For this command, a **1** enables and a **0** disables.

To enable Automatic Shutdown:

cli>enclosure -a mod -s "allowshutdown=1"

For this command, a **1** enables and a **0** disables.

To set the minimum fan speed to medium high:

cli>enclosure -a mod -s "minfanspeed=3"

For this command:

- **1** means low
- **2** means medium-low
- **3** means medium-high
- **4** means high

The actual speed depends on the fan manufacturer.

To display a complete list of Enclosure commands:

cli>enclosure -h

Help Command

The VTrak CLI uses the standard Unix online help system.

To access general help:

cli>help

To access help with a specific function:

>   cli>help cable
>
>   cli>cable -help
>
>   cli>cable -h

Choose any command from the list under "CLI Command Set" on page 35.

Link Command

The Link command displays information about J610s and J310s links, including:

- Link Status
- Link Counter

Viewing Link Status

To view link status:

>   cli>link

The system returns:

Link Status:

	Port	Type	Rate	Init	Dev	Link	PRdy
P 0	D01	SAS	3.0G	OK	End	----	Rdy
P 1	D02	SAS	3.0G	OK	End	----	Rdy
P 2	D03	SAS	3.0G	OK	End	----	Rdy
P 3	D04	SAS	3.0G	OK	End	----	Rdy
P 4	D05	SAS	3.0G	OK	End	----	Rdy
P 5	D06	SAS	3.0G	OK	End	----	Rdy
P 6	D07	SAS	3.0G	OK	End	----	Rdy
P 7	D08	SAS	3.0G	OK	End	----	Rdy
P 8	D09	SAS	3.0G	OK	End	----	Rdy
P 9	D10	SAS	3.0G	OK	End	----	Rdy
P10	D11	SAS	3.0G	OK	End	----	Rdy
P11	D12	SAS	3.0G	OK	End	----	Rdy
P12	D13	SAS	3.0G	OK	End	----	Rdy
P13	D14	SAS	3.0G	OK	End	----	Rdy
P14	D15	SAS	3.0G	OK	End	----	Rdy
P15	D16	SAS	3.0G	OK	End	----	Rdy
P16	CN1	----	----	----	----	----	----
P17	CN1	----	----	----	----	----	----
P18	CN1	----	----	----	----	----	----
P19	CN1	----	----	----	----	----	----
P20	CN2	SAS	3.0G	OK	End	----	Rdy
P21	CN2	SAS	3.0G	OK	End	----	Rdy

| P22 | CN2 | SAS | 3.0G | OK | End | ---- | Rdy |
| P23 | CN2 | SAS | 3.0G | OK | End | ---- | Rdy |

Port:Port Id   Type:SAS   Rate:Rate 3G
Init:Init Passed   Dev:Device Type   Link:Link Connected
PRdy:Phy Ready

The following items are reported in the table above:

- **Link number** – The links are PHYs, numbered P0 through P23
- **Port number** – D01 through D16 represent drive slots. Each slot has one PHY. D13 through D16 are empty on J310s units. See "Drive Numbering" on page 19.

  CN1 and CN2 represent the external SAS port connectors. Each port has four PHYs. CN1 is labeled with a circle icon. CN2 is labeled with a diamond icon. See Figure 3 on page 33

- **Drive Type** – SAS
- **Data Rate** – 3.0 Gb/s
- **Device Type** – **End** means an end device. **Exp** means an expansion device
- **Link Connection** – Normally, ---- is displayed. If there is a connection at the moment the link command runs, it will display CONN
- **Phy Ready Status** – If the port is ready, it will display Rdy

  Link Counter:

	InDW	DsEr	DwLo	PhRe	CoVi	PhCh
P 0	----------	----------	----------	----------	----------	0x11
P 1	----------	----------	----------	----------	----------	0x61
P 2	----------	----------	----------	----------	----------	0x0D
P 3	----------	----------	----------	----------	----------	0x0D
P 4	----------	----------	----------	----------	----------	0x01
P 5	----------	----------	----------	----------	----------	0x61
P 6	----------	----------	----------	----------	----------	0x11
P 7	----------	----------	----------	----------	----------	0x0D
P 8	----------	----------	----------	----------	----------	0x0D
P 9	----------	----------	----------	----------	----------	0x01
P10	----------	----------	----------	----------	----------	0x0D
P11	----------	----------	----------	----------	----------	0x0D
P12	----------	----------	----------	----------	----------	0x01
P13	----------	----------	----------	----------	----------	0x5D
P14	----------	----------	----------	----------	----------	0x0D
P15	----------	----------	----------	----------	----------	0x09
P16	----------	----------	----------	----------	----------	----
P17	----------	----------	----------	----------	----------	----
P18	----------	----------	----------	----------	----------	----
P19	----------	----------	----------	----------	----------	----

```
P20  ----------  ----------  ----------  ----------  ----------  0x8F
P21  ----------  ----------  ----------  ----------  ----------  0x8F
P22  ----------  ----------  ----------  ----------  ----------  0x8F
P23  ----------  ----------  ----------  ----------  ----------  0x8F
```

InDW:Invalid Dword Count   DsEr:Disparity Err Count
DwLo:Dword Sync Loss Count
PhRe:Phy Reset Problem Count   CoVi:Code Violations Cnt
PhCh:Phy Change Count

The following items are reported in the table above. All counts are hexadecimal:

- Link number – Links are PHYs, numbered P0 through P23.

   The Link Status list matches Link number to Port number, where you can identify the specific disk drive or external SAS port reported in the Link Counter. See page 40.

- Invalid D-word Count

- Disparity Error Count

- PHY Reset Problem Count

- Code Violation Count

- PHY Change Count

If the count is zero, the counter shows dashes (----------). The fact that errors occur does not necessarily indicate a problem or that the J610s or J310s unit is malfunctioning.

An individual error count that increments regularly indicates a possible problem and requires further investigation.

Clearing the Error Count

To clear the link error count:

   cli>link -a clear

Route Command

To view the SAS addresses of the devices in your domain:

   cli>route

The system returns:

```
Routing Table Mapping:
Entry#   SAS Address           CnID
----------------------------------------------------
0159     500000E0114D8FB2      CN2
0163     500000E0114C2252      CN2
0202     500000E0120B3562      CN2
```

0238	500000E01212F582	CN2
0287	500000E0120B26B2	CN2
0365	5000155FFFC0223E	CN2
0462	500000E0114F18F2	CN2
0468	500000E01205B472	CN2
0542	500000E01122C5B2	CN2
0624	500000E0114E4A32	CN2
0639	500000E0114D8E32	CN2
0700	500000E0120B2A62	CN2
0721	500000E0114DE7A2	CN2
0751	500000E0114E5EA2	CN2
0764	500000E0120B28F2	CN2
0765	500000E0114C2342	CN2
0977	500000E0120A2472	CN2
1023	5000155FFFC02408	CN2

The route command displays SAS addresses that are attached to the SAS ports of the J610s or J310s unit. Three items are reported:

- **Entry#** – Arbitrary numbers, listed in sequence
- **SAS Address** – Of the disk drive or other component
- **CnID** – External SAS port connector number 1 or 2

The device in this example is connected to a J610s unit through connector CN2. See page 21 for a diagram of connectors on the I/O module.

Route Troubleshooting

If your system returns:

    No SAS Routing Entry Exists

...it indicates that no downstream devices are found.

Uptime Command

The uptime command informs you of the elapsed period of time since the J610s or J310s unit was powered on.

To display uptime:

    cli>uptime

The system returns:

    System has been running 1 day 9 hours 46 minutes 36 seconds

VPDR Command

The vpdr command displays vital product data on the major components of the VTrak. There are six components that report vital product information.

- **1** – Controller (I/O module)
- **2** – Power Supply 1
- **3** – Cooling Unit 1
- **4** – Power Supply 2
- **5** – Cooling Unit 2
- **6** – Backplane

Specify the component by its number. For I/O modules, the system reports for the module to which you made your CLI connection. See "Setting Up the CLI Connection" on page 29

For example, to display vital product data for the I/O module:

cli>vpdr -i 1

The system returns:

```
Board ID    :0
OEM Name   :PROMISE
OEM Model  :3U-SAS-16-D BP
Mfg Part   :IOC-J610s-01
Mfg SN     :B17D07138400004
Mfg Rev    :A1R1.0
Mfg Date   :2007:02:15
WWN        :20 00 00 01 55 FF FC 0D
```

? Command

The VTrak CLI uses the standard Unix online help system.

For the command usage of a particular function:

cli>cable -?

cli>? cable

Choose any command from the list under "CLI Command Set" on page 35.

Chapter 4: Support

- Frequently Asked Questions (below)
- Contacting Technical Support (page 46)
- Limited Warranty (page 49)
- Returning product for repair (page 50)

Frequently Asked Questions

What kind of disk drives can I use with VTrak?

The J610s and J310s support 3.5-inch Serial Attached SCSI (SAS) disk drives and SATA II disk drives. If your VTrak has dual I/O modules, you must install an AAMUX adapter on each of your SATAII drives.

How can I tell when the VTrak has fully booted?

When the J610s or J310s unit is fully booted up, the Power and FRU LEDs will light up green. The heartbeat LED blinks green once every 3 seconds if one I/O module is installed, or twice every 3 seconds if two I/O modules are installed.

How can I tell my CLI connection is to the primary default I/O module?

After you establish the CLI connection, type Enclosure and press Enter. Look at the top of the display for an item called I/O Module Role. If the Role is **Primary**, you are connected to the default primary I/O module. If the Role is **Secondary**, you are connected to the default secondary.

What happens if a disk drive fails?

Depending on the nature of the failure, the failed drive the drive might not appear in the CLI—or the failed drive might appear with some errors—when you run the **enclosure** command (see page 36) or the **link** command (see page 40).

Can I hot-swap a failed drive with a new one?

Yes. Disk drives are hot-swappable on the J610s and J310s units.

Can the VTrak run using just one power supply?

Yes, it is possible to run J610s and J310s unit on a single power supply. The units will continue running if one of the power supply fails. However, leaving one power supply off reduces air flow through the enclosure and can contribute to overheating. Always switch on both power supplies.

Contacting Technical Support

Promise Technical Support provides several support options for Promise users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

	Important
✓	Promise offers 24x7 live technical support (in English only) for registered owners of VTrak products. To register, point your browser to: http://www.promise.com/support/warranty/ warranty_eng_pdchoose.asp

If you decide to contact us, please have the following information available:

• Product model and serial number

• BIOS, firmware and driver version numbers

• A description of the problem / situation

• System configuration information, including: motherboard and CPU type, hard drive model(s), SAS/SATA/ATA/ATAPI drives & devices, and other controllers.

Technical Support Services

Promise Online™ Web Site	http://www.promise.com/support (technical documents, drivers, utilities, etc.)

United States

E-mail Support	e-Support On-Line
Fax Support	(408) 228-1097 Attn: Technical Support
Phone Support	(408) 228-1400 option 4
If you wish to write us for support:	Promise Technology, Inc. 580 Cottonwood Drive Milpitas, CA 95035, USA

The Netherlands

E-mail Support	e-Support On-Line
Fax Support	+31 (0) 40 256 9463 Attn: Technical Support
Phone Support	+31 (0) 40 235 2600
If you wish to write us for support:	Promise Technology Europe B.V. Science Park Eindhoven 5542 5692 EL Son, The Netherlands

Germany

E-mail Support	e-Support On-Line
Fax Technical Support	+49 (0) 2 31 56 76 48 - 29 Attn: Technical Support
Phone Technical Support	+49 (0) 2 31 56 76 48 - 10
If you wish to write us for support:	Promise Technology Germany Europaplatz 9 44269 Dortmund, Germany

Italy

E-mail Support	e-Support On-Line
Fax Support	0039 06 367 12400 Attn: Technical Support
Phone Support	0039 06 367 12626
If you wish to write us for support:	Promise Technology Italy Piazza del Popolo 18 00187 Roma, Italia

Taiwan

E-mail Support	e-Support On-Line
Fax Support	+886 3 578 2390 Attn: Technical Support
Phone Support	+886 3 578 2395 (ext. 8811)
If you wish to write us for support:	Promise Technology, Inc. 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsin-Chu 30075, Taiwan, (R.O.C.)

China

E-mail Support	e-Support On-Line
Fax Support	+86-10-8857-8015 Attn: Technical Support
Phone Support	+86-10-8857-8085/8095
If you wish to write us for support:	Promise Technology China Room 1205, Tower C Webok Time Center, No.17 South Zhong Guan Cun Street Hai Dian District, Beijing 100081, China

Limited Warranty

Promise Technology, Inc. ("Promise") warrants that for three (3) years from the time of the delivery of the product to the original end user:

a) the product will conform to Promise's specifications;

b) the product will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice.

d) Is not valid on spare parts, fans, and power supplies

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise DISCLAIMS any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise DOES NOT WARRANT that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

- a) replace the product with a conforming unit of the same or superior product;

- b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Returning Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support Staff through one of our Technical Services, making sure to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician will assist you in determining whether the product requires repair. If the product needs repair, the Technical Support Department will issue an RMA (Return Merchandise Authorization) number.

Important

Obtain an RMA number from Technical Support *before* you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return ONLY the specific product covered by the warranty (do not ship cables, manuals, diskettes, etc.), with a copy of your proof of purchase to:

USA and Canada: Promise Technology, Inc.
                    Customer Service Dept.
                    Attn.: RMA # _____
                    47654 Kato Road
                    Fremont, CA 94538

Other Countries: Return the product to your dealer
                     or retailer.

                     Contact them for instructions
                     before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise will pay for standard return shipping charges only. You will be required to pay for any additional shipping options (such as express shipping).

Appendix A: Second I/O Module

The VTrak J610s and J310s units ship with one or two I/O modules. If your VTrak came with only one I/O module, you can upgrade by installing a second I/O module. The following instructions describe how to install a second I/O module.

To install a second I/O module into a VTrak J610s or J310s unit:

1. Power down the VTrak.
2. Press the release button on the dummy I/O module, pull the handle down and remove the dummy I/O module from the enclosure.
3. Slide the new I/O module into the slot.
4. Gently push the new I/O module all the way into the slot until the handle locks.
5. Connect your data cables to the new I/O module.

   See page 20 for more information.
6. Optional. Connect your serial cable to the second I/O module.

   See page 27 for more information.
7. Power up the VTrak.

To verify proper installation and function, run the **enclosure** command in the CLI. Because the new I/O module is installed in the right slot, it will automatically take the **Standby** role in the CLI screen. See page 36 for more information.

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